

Global Grid Forum 12, Brussels, Belgium
Tuesday September 21, 2004

Tutorial 7: Grid Portals

Organizer:

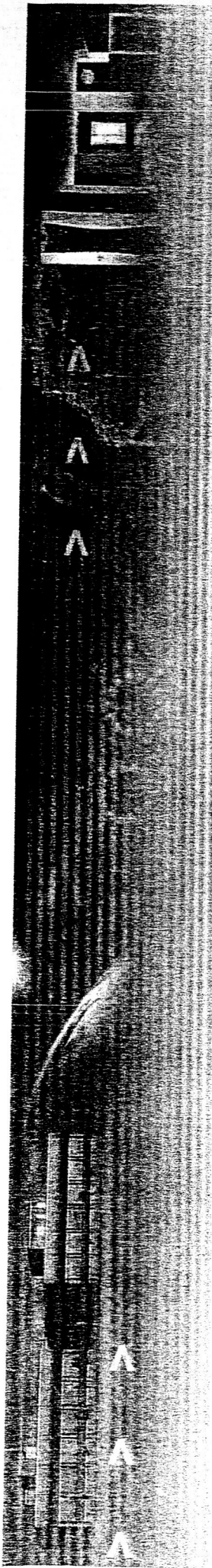
Arsi Vaziri
NASA Ames Research Center

Instructors:

Marlon Pierce, Indiana University
Dennis Gannon, Indiana University
Arsi Vaziri, NASA Ames
Jason Novotny, Albert Einstein Institute
Michael Russell, Albert Einstein Institute
Gregor von Laszewski, Argonne National Lab

Schedule

9:00 - 9:55	Developing Grid Portals	Marlon Pierce
9:55 - 10:15	Portals & Remote Services	Dennis Gannon
10:15 - 10:30	Space Operations Portal	Arsi Vaziri
10:30 - 11:00	Break	
11:00 - 11:15	CoG Kits & Grid portals	Gregor von Laszewski
11:15 - 11:55	GridSphere Overview	Jason Novotny
11:55 - 12:30	Grid Portlets Overview	Michael Russell



Space Development Operations Grid Portal (SpaceDOG Portal)

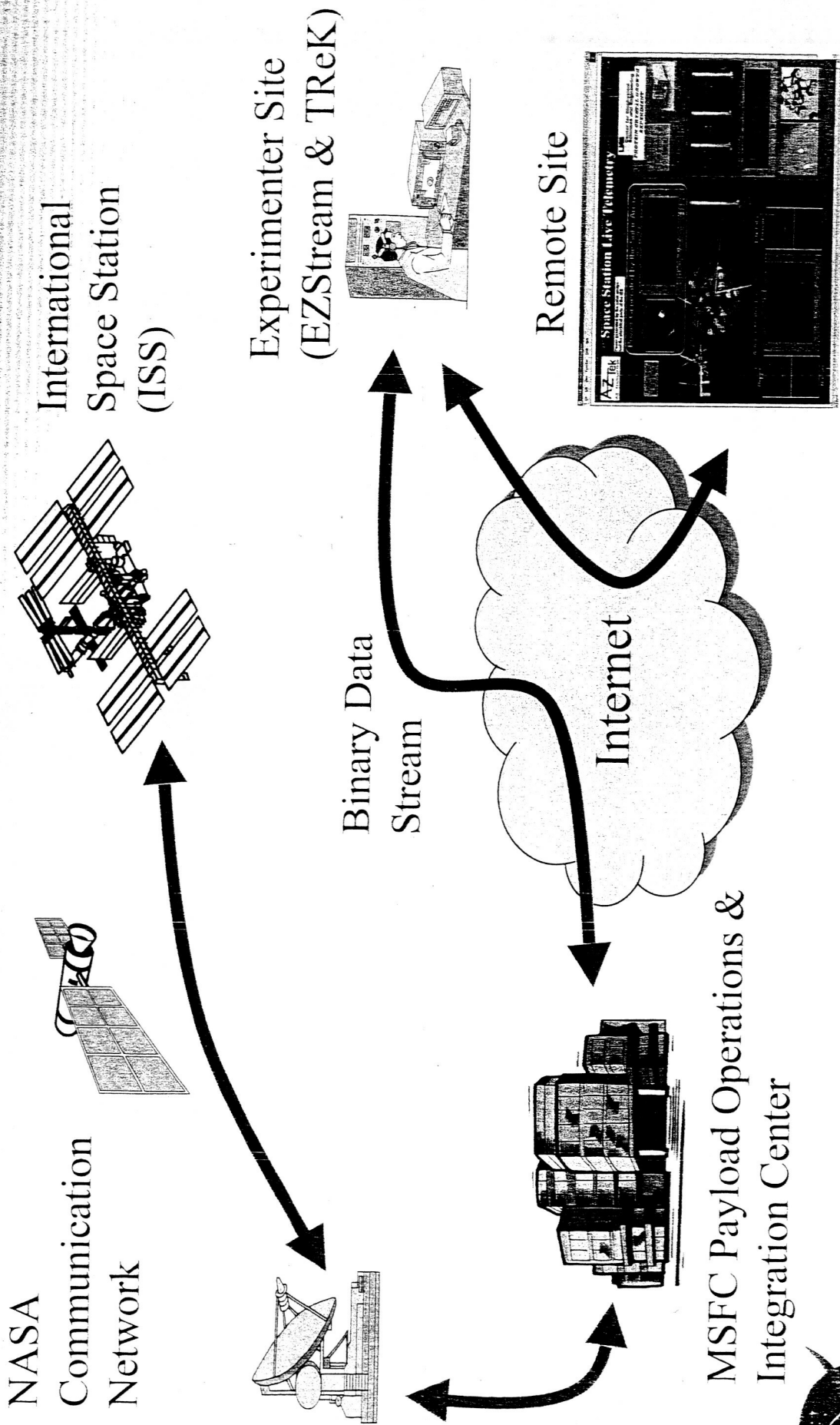
Arsi Vaziri

NASA Advance Supercomputing (NAS) Division
NASA Ames Research Center

21 Sept 2004



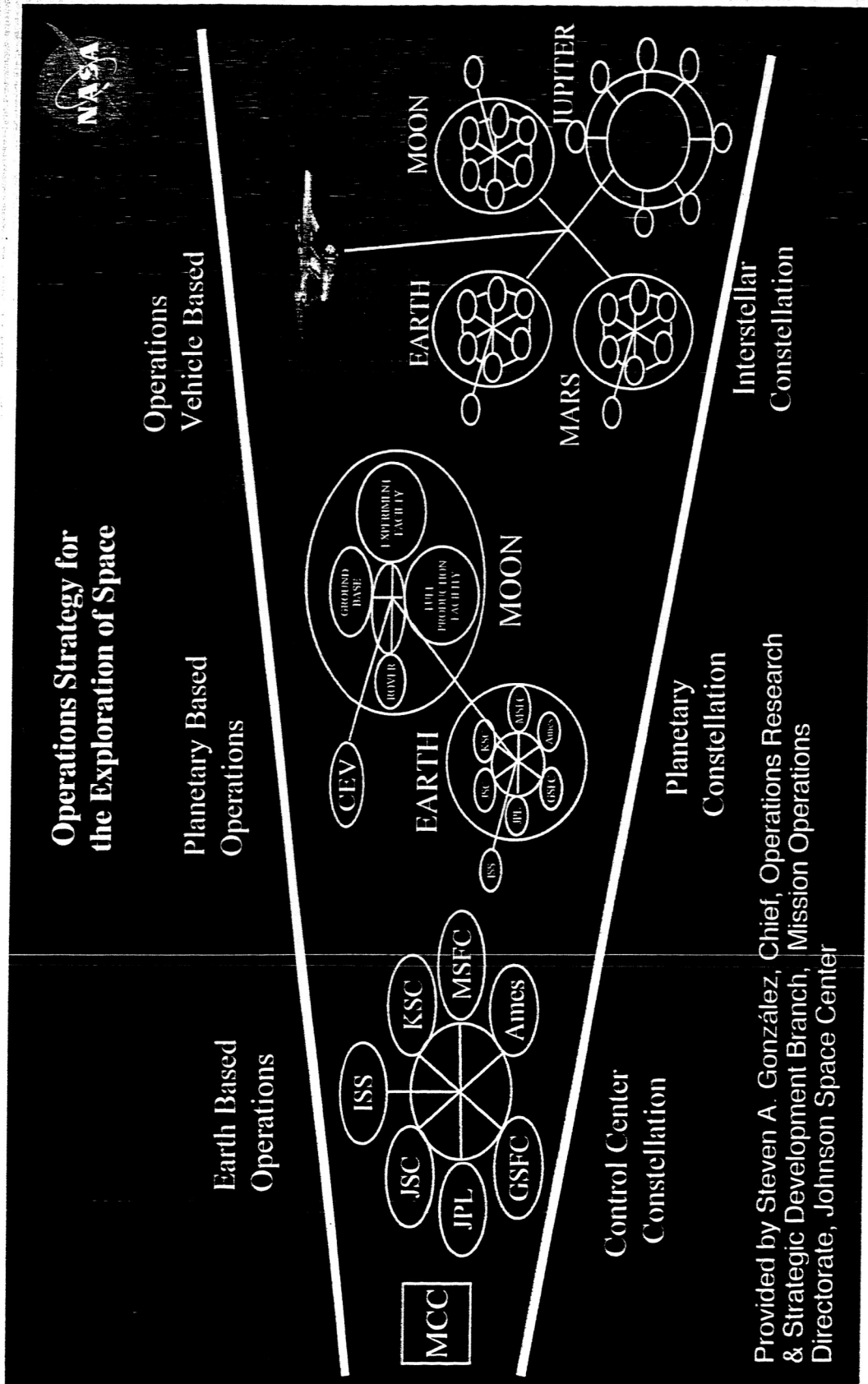
Science Operations for ISS Data



Slide source: AZ Technology Inc.



Mission Control Center Evolution

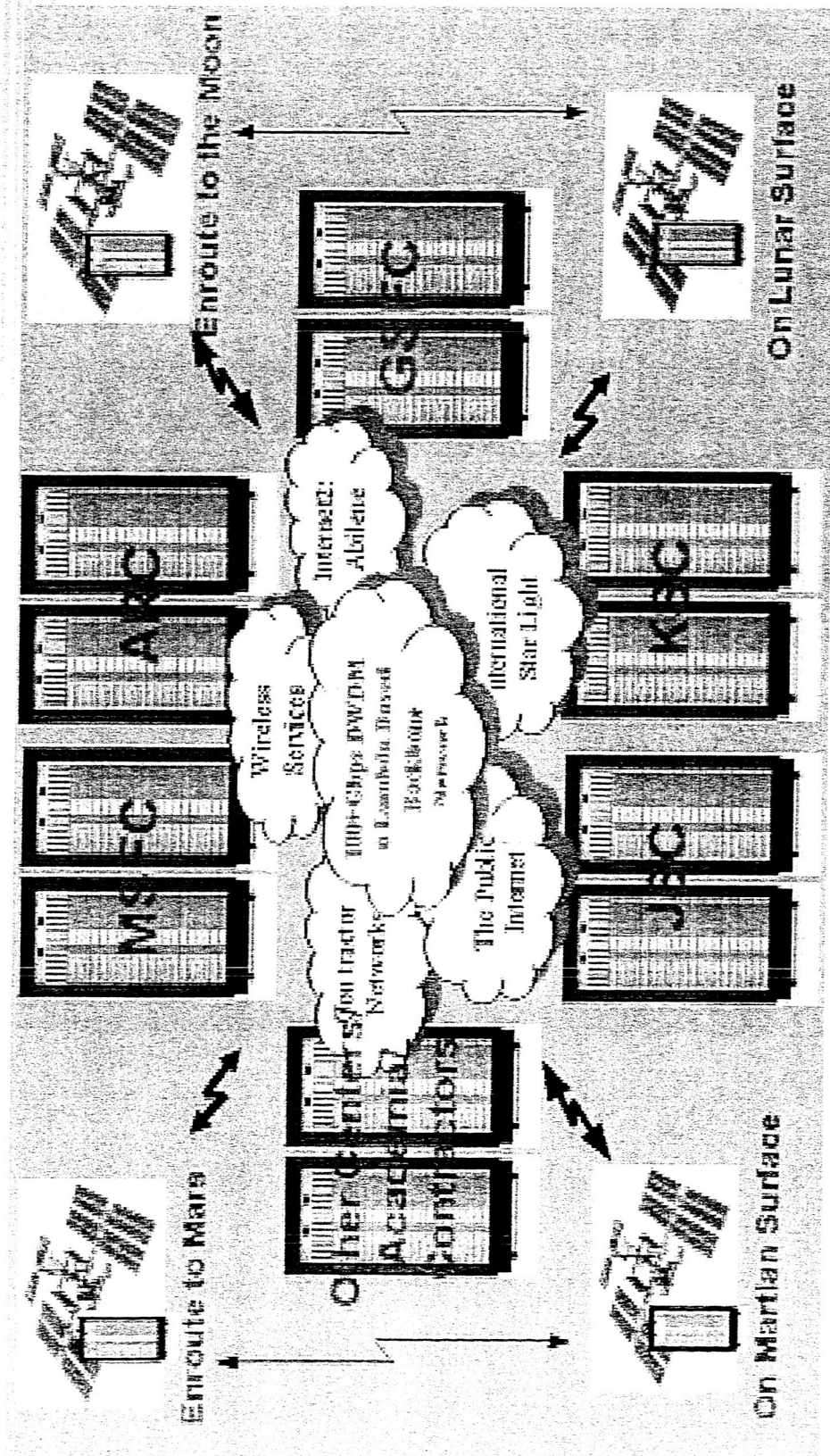


Provided by Steven A. González, Chief, Operations Research & Strategic Development Branch, Mission Operations Directorate, Johnson Space Center

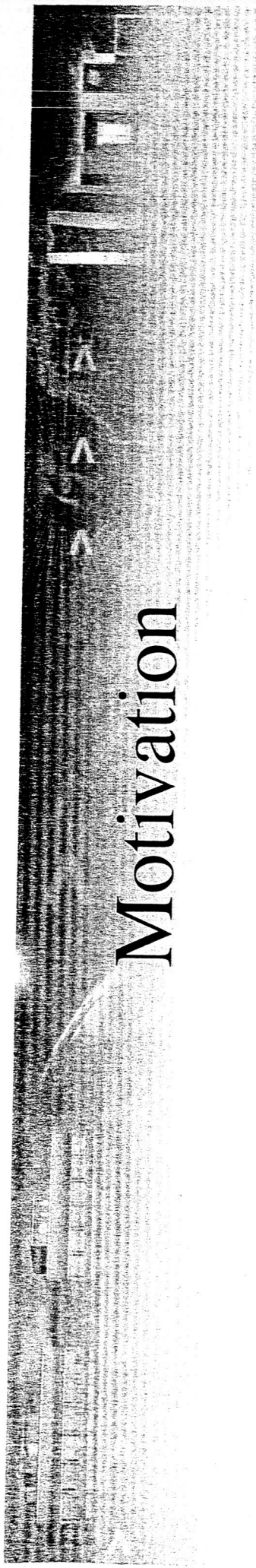


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Future space missions data communications



Slide provided by Bob Bradford, MSFC



Motivation

- The Mission Control Center (MCC) and the Payload Operations Integration Center (POIC) provide operational services and/or coordination for all manned space missions and on-board scientific payloads and experiments
- The Problem:
 - Disparate organizations/disciplines and systems providing spaceflight operational services (i.e. voice, video, telemetry, command) are stove piped resulting in duplicated services across systems that do not interact well or at all
 - Science disciplines for the most part cannot interact at the data level because data is heterogeneous and distributed

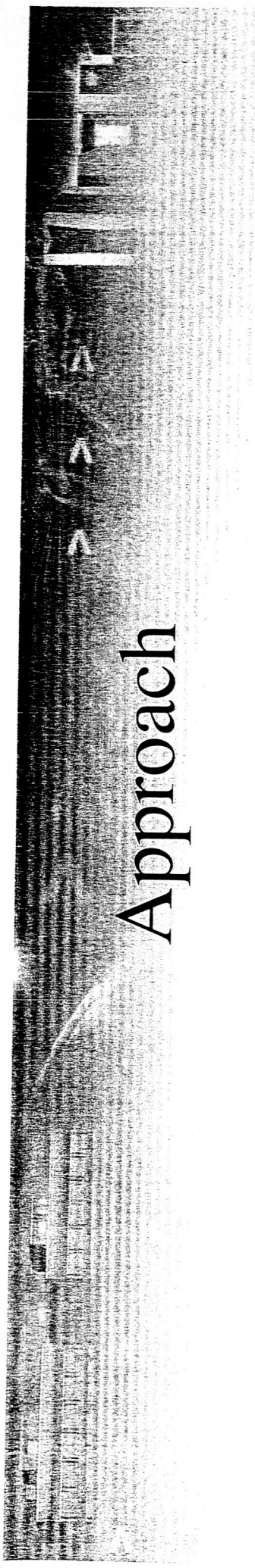




Objectives

- Provide a fully functional Grid-enabled prototype to support distributed and secure access to Payload Operations Integration Center (POIC) and Mission Control Center (MCC) ground services
- Provide new and improved services to the Principal Investigator and Control Center environments
- Improve security end to end
- Provide a single interface to use and access MCC and POIC provided applications

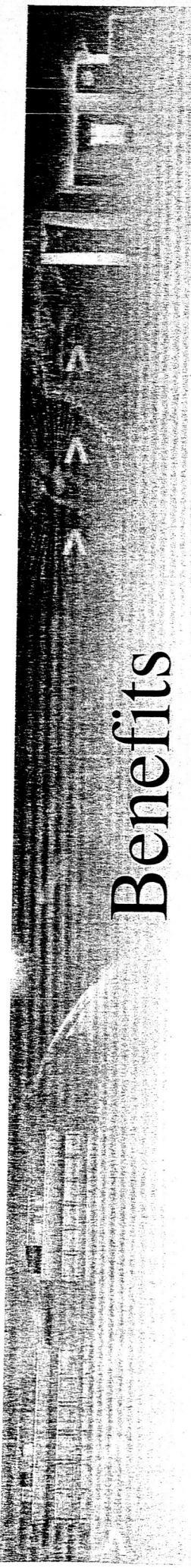




Approach

- Create a prototype Grid-based environment for Space Flight Operations utilizing replicated POIC and MCC ground services in a non-operational environment.
- Develop virtual organizations (VOs) along with VO-specific portals for four end-user communities
 - Payload Principal Investigators
 - Payload Control Center
 - Flight Control Center
 - Educational Outreach
- Measure the effectiveness of the Grid-enabled environment through hands-on user evaluation





Benefits

- Provide a single interface for secure and distributed access to new and current POIC and MCC ground services at significantly lower costs
- Reduce development costs for future science applications and space flight system development, replacement and upgrades
- Leverage research and development of research enterprise and international research community to enable inter-discipline science collaboration creating new information and knowledge



Information Power Grid

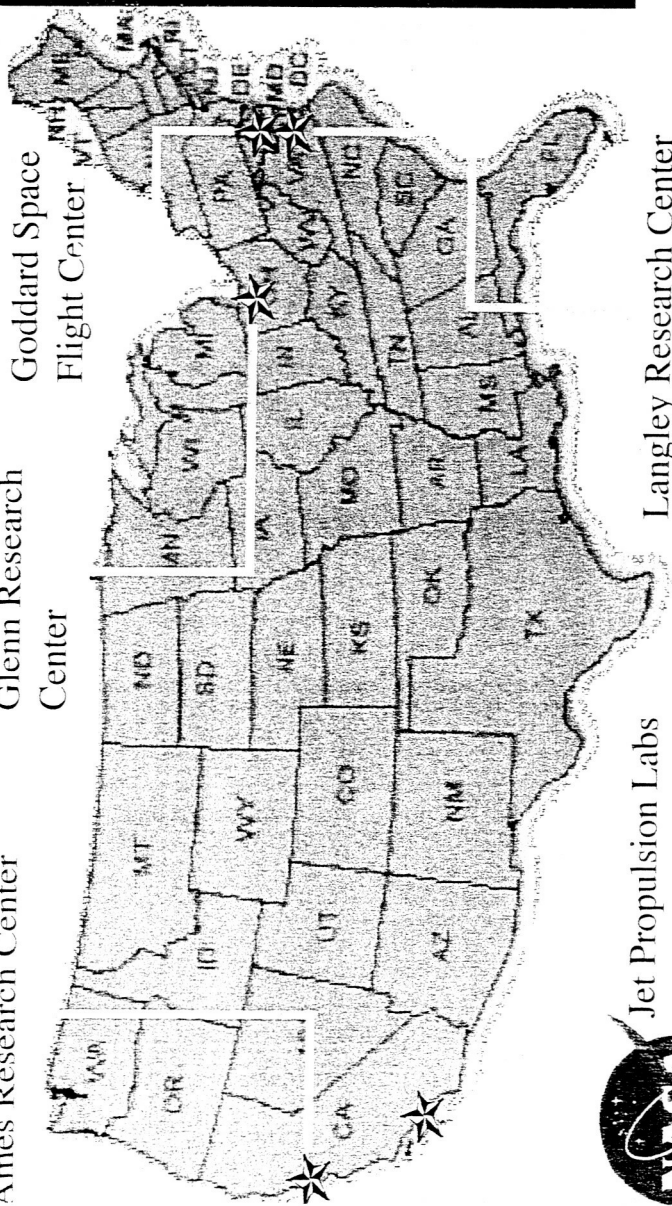
Vision:

Use Grid technology to make the practice of large-scale science and engineering, as well as other widely distributed, data intensive NASA activities, much more effective than it is today.

Ames Research Center

Glenn Research Center

Goddard Space Flight Center



Jet Propulsion Labs



Langley Research Center

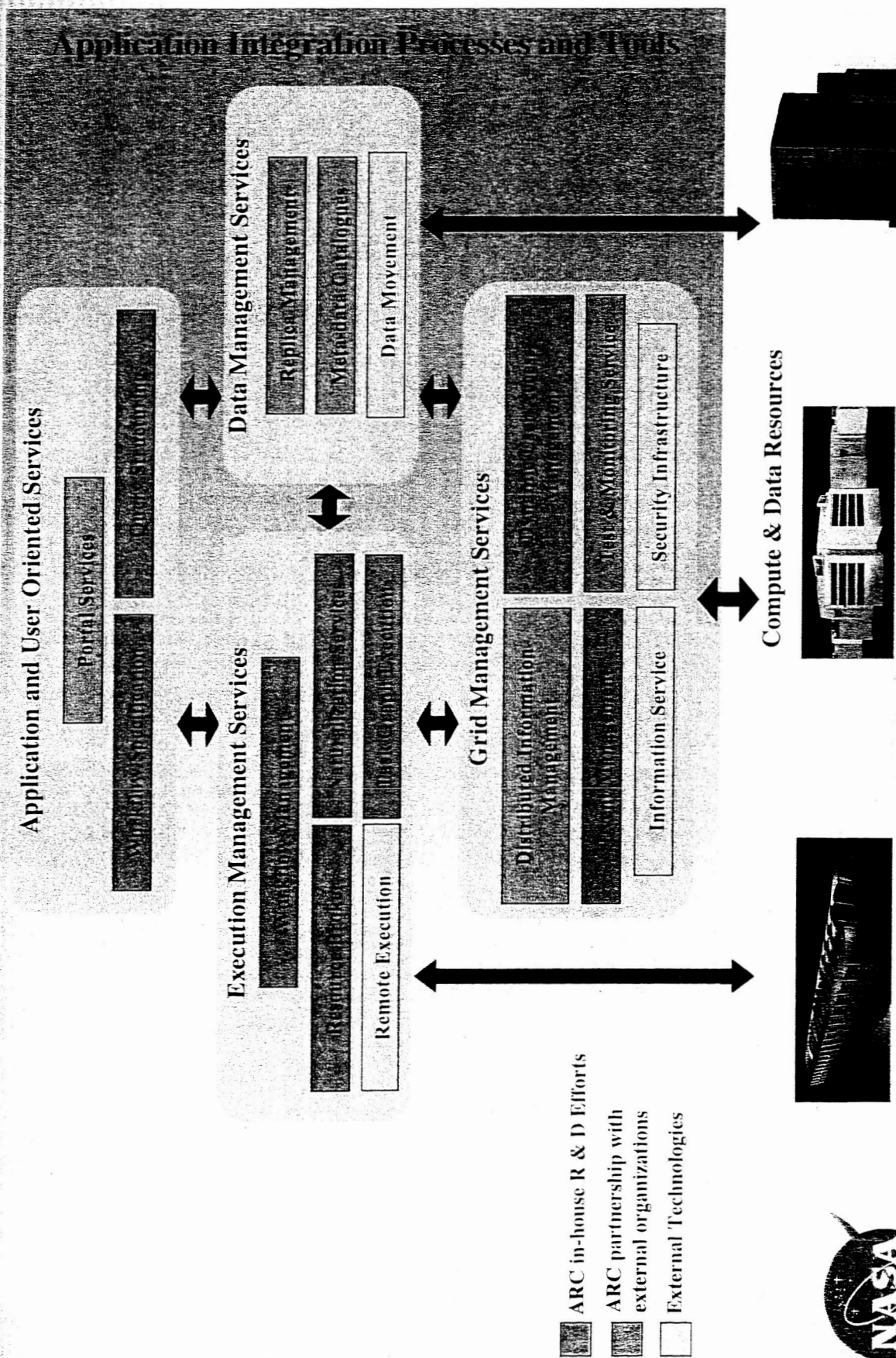
Grid Nodes

1. (8) 512 CPU SGI Altix LINUX ARC-being built
2. 1024 CPU SGI O3K IRIX ARC
3. 512 CPU SGI O3K IRIX ARC
4. 128 CPU (node) LINUX Cluster GRC
5. 128 CPU SGI O2K IRIX ARC
6. 128 CPU SGI O2K IRIX ARC
7. 64 CPU SGI O2K IRIX ARC
8. 32 CPU SGI O2K IRIX ARC
9. 24 CPU SGI O3K IRIX ARC
10. 24 CPU SGI O2K IRIX GRC
11. 16 CPU SGI O2K IRIX LaRC
12. 16 CPU SGI O2K IRIX ARC
13. 12 CPU (node) LINUX Cluster (in progress)
14. 8 CPU SGI O3K IRIX LaRC
15. 8 CPU SUN Ultra SPARC3 ARC - Storage
16. 8 CPU SGI O2K IRIX ARC - Storage
17. 8 CPU SGI O3K IRIX JPL
18. 8 CPU SGI O3K IRIX GSFC (planned)
19. 4 CPU LINUX ARC (planned)
20. Numerous IPG development machines

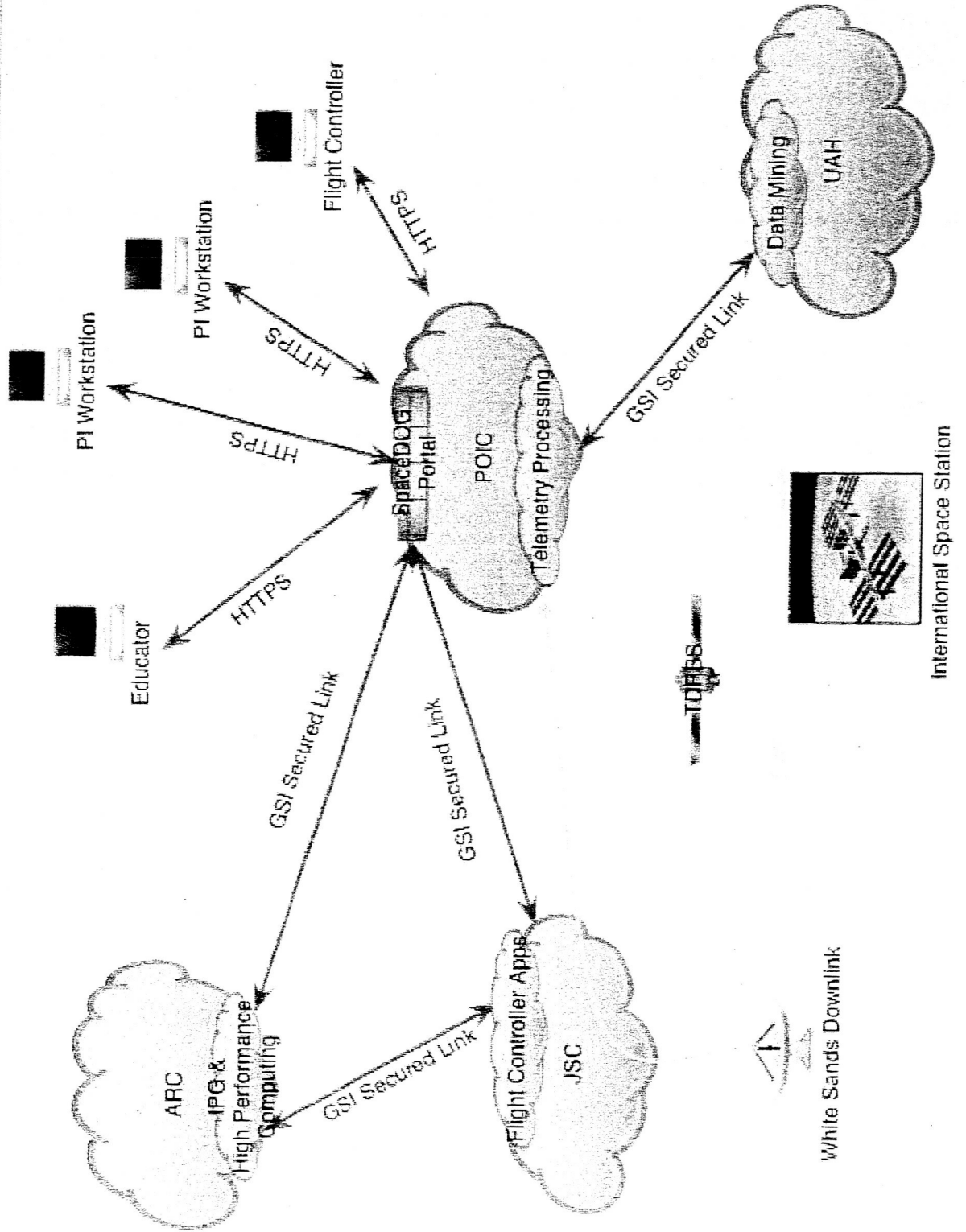
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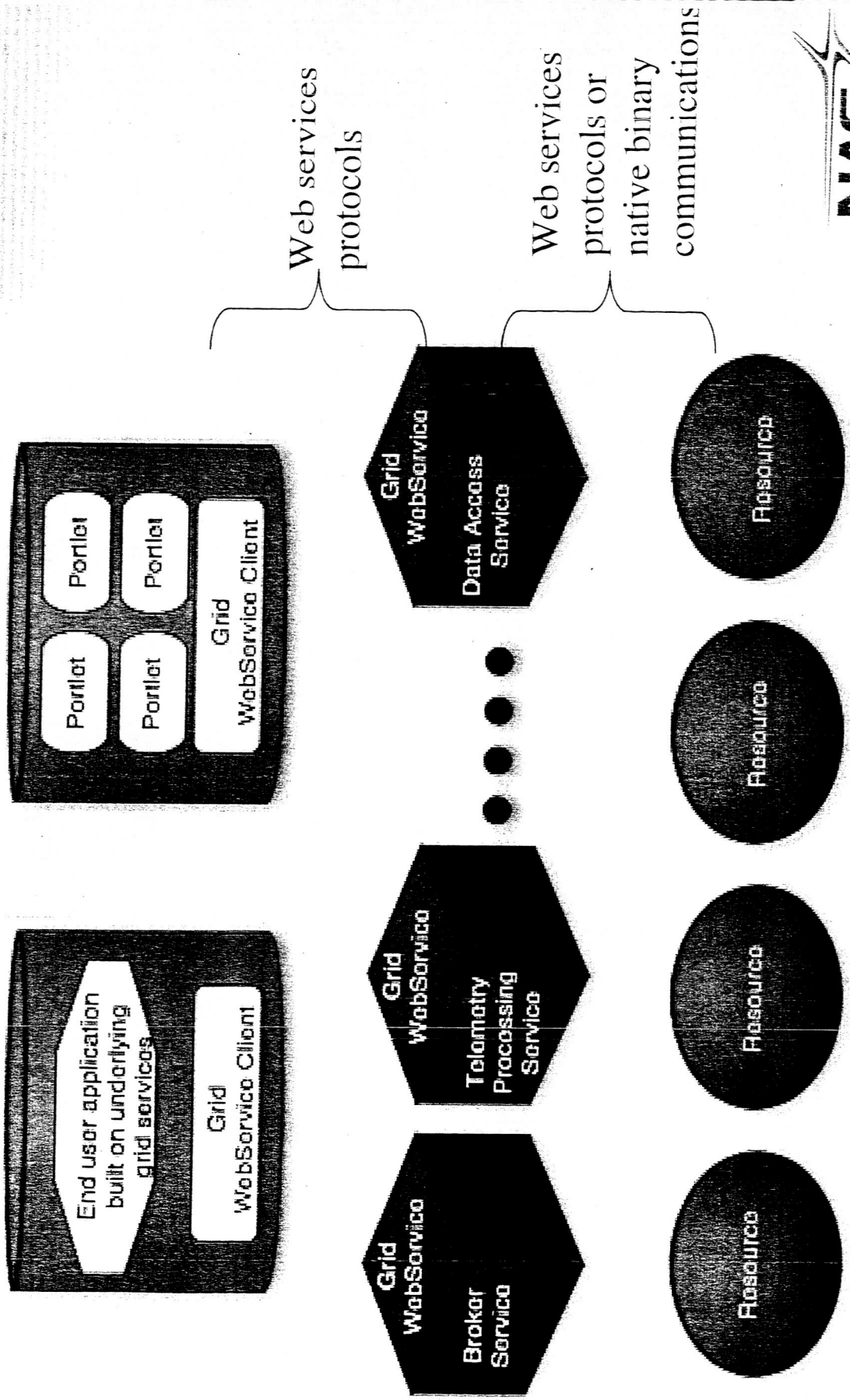
NASA Grid Development



SpaceDOG Architecture



SpaceDOG Service Architecture



SpaceDOG Prototype Services Overview

Service:	Definition:	Base System
1. Data/Telemetry Mgt	Provide TReK telemetry management services http://trek.msfc.nasa.gov	TReK
2. Experiment/System CMD Mgt	Provide TReK command management services http://trek.msfc.nasa.gov	TReK
3. ISS DL Video Distribution	Provide varying bandwidth rates to all VO's, sense native network and adjust rate	GViDS
4. Web Measure Delivery w/Wireless	Provide individual measurements over the Web and to wireless devices	TReK/EZStream
5. Caution and Warning	Provides information to the flight controller about events on the ISS	JSC Caution and Warning
6. WebLog	Web enabled log book in testing for use in MCC	JSC Web/Oracle DB
6. High Performance Processing*	Access massively parallel and other processing cycles in real and near real-time	ARC/IPG
7. Data Mining*	Analyze and combine new and archived data to find new information and knowledge	UAH Data Mining
8. High Volume Network Storage*	Use massive storage capabilities through the Web securely	ARC/UAH NW Storage
9. Visualization*	Enable users to see their data in 2D and 3D	ARC TBD or CAVE
10. Mission Voice	Access the mission voice loops provided by IVoDS http://ivods.msfc.nasa.gov	IVoDS
11. Collaborative Internet Voice*	Upgrade to IVoDS to provide application sharing, IM, video telecon and mission voice	CVoDS
12. Video Auditorium*	A new approach to video teleconferencing still in development	Video Auditorium
13. Mission Planning and Scheduling		PPS/INEXUS/ROSE
14. Application Sharing*	Ability for a user to "plug in" discipline specific applications under the Grid services umbrella	
14. a. Antenna Pointing System 14. b. Shuttle Flight Data Mine		Antenna Pointing Sys UAH Data Mining
15 System Performance & Measurement	For the prototype and beyond measure network and application performance	TBD
16 Networks Connectivity	All the network connectivity from the prototype to the users	NREN/NPN/Abilene



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NMI Portal: My Workspace; Proxy Manager

http://lpg15.jpg.nasa.gov:10081/nmi/portal/user/ckeller/js_pane/P-f0545dae05-100lw Q Google

Rendezvous v NMI Portal: Welcome Java Java 1... ac OS X: JINI ONJavacom: ... 08, 2003] Step 6: Run the Program Apple Mac Amazon eBay Yahoo! News

SpaceDOG portal

My Workspace SDOG Developers
xportlets : ProxyManager

Home Membership Schedule Resources News Discussion Chat

No proxy available!

The following GSI proxy credentials are loaded into your account:

No proxies currently loaded

Click the button below to add a GSI proxy credential to your account:

Get New Proxy

XPortlets: Gram Job Launcher

Launch a Gram Job

Executable name *	
Parameters	
Host name *	
Executable Directory	
Output file *	

Proxy Manager
LDAP Browser
GridFTP
GridContext
OGSABrowser
GPTR - Machine Summary
GPTR - System Monitor
GPTR - Grid View
Anabas test
NewsGroup (Read/Post)
NewsGroup (Requests)
NewsGroup (Admin)
Bibtex (Read/Edit)
Bibtex (Requests)
Bibtex (Admin)

xportlets : Gridping Help

Service List:
chunk.extreme.indiana.edu
195ftp://baldy.extreme.indiana.edu:2811
hunk.extreme.indiana.edu
k2.extreme.indiana.edu
rainier.extreme.indiana.edu

Remove

Services to be checked:

Service:
evelyn.hns.nasa.gov

hnp Refresh

Directions:

First, load your proxy (for authentication and authorization) through the **ProxyManager** portlet. To add services to be checked, you can either choose one or multiple items from the service list on the left, or enter a new service URL in the bottom textbox. Then, click the corresponding button to add the item(s) to the right-to-be-checked list. To add a service(s) back to the backup service list. To check services, you either check them all by clicking the "hnp" button, or you can selectively choose some of them first, then click the "hnp" button. If the item listed in the right box begins with "!", that means it is not available. You may continue to check its availability before clicking "Refresh" which will expel them from your "Services to be checked" list. To remove items from the service list, select the service you wish to remove in the service list and then click the "Remove" button.

Grid Job Submission Portlet

Sorry, you cannot submit a job. You don't have any valid certificates.
Please use the MyProxy credential access portlet to get a proxy certificate.

Monitor submitted jobs

May 20, 2004 09:46 am

Payload Ops Home

Payload Ops Announcements

Payload Ops Bookshelf

General Tools

Telemetry Measurements

Security

System Monitoring

Grid Computing

Voice Tools

Video Tools

Collaboration Tools

Visualization Tools

Network Based Storage

Application Sharing

Engineering and Dev Tools

Outreach Tools

Telemetry Management

Command Management

Caution and Warning

Data Mining

WebLogger

My Workspace

Flight-Ops

Lobby

Outreach

PI-Ops

(more)

Payload-Ops

System Names, CPU #'s, Architecture



NASA Advanced Supercomputing

Close



☐ System Inventory

JUL 30 14:33

Host	arch	memory	#cpu	i/clock type	gflop
columbia	Altix	120 Gb	64	4 1500-Mhz Itanium	384
columbia1	Altix	994 Gb	512	4 1500-Mhz Itanium	3072
columbia2	Altix	993 Gb	512	4 1500-Mhz Itanium	3072
columbia3	Altix	993 Gb	512	4 1500-Mhz Itanium	3072
columbia4	Altix	993 Gb	512	4 1500-Mhz Itanium	3072
columbia5	Altix	993 Gb	512	4 1500-Mhz Itanium	3072
columbia6	Altix	993 Gb	512	4 1500-Mhz Itanium	3072
columbia8	Altix	993 Gb	512	4 1500-Mhz Itanium	3072
lomaax	CRK	256 Gb	512	2 600-Mhz IP35	614
loma	CRK	10 Gb	20	2 400-Mhz IP35	16
			4180		22518



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[Engineering and Dev Tools](#)
[Outreach Tools](#)
[Telemetry Management](#)
[Command Management](#)
[Caution and Warning](#)
[Data Mining](#)
[WebLogger](#)
[Logout](#)
[The IVoDS Web Site](#)
[The IVoDS Web Site](#)
[My Workspace](#)
[Flight-Ops](#)
[Lobby](#)
[Outreach](#)
[PI-Ops](#)
[\(more\)](#)
[Payload-Ops](#)
[Center Mission Voice Switches](#)

Marshall Space Flight Center

IVoDS

Internet Voice Distribution System (IVoDS)

In Support of International Space Station Remote Payloads Operations

The IVoDS system was developed for Marshall Space Flight Center (MSFC) Flight Projects Directorate (FPD) to support International Space Station (ISS) communications, IVoDS allows Internet-based participants to talk/listen on one conference while listening to seven others. This multi-conferencing system links researchers, NASA Operations Personnel, and ISS crew together to support collaboration during Space Station experiment operations & planning. The IVoDS mission voice system will provide audio communications to remote users via Internet Protocol (IP) based communications.

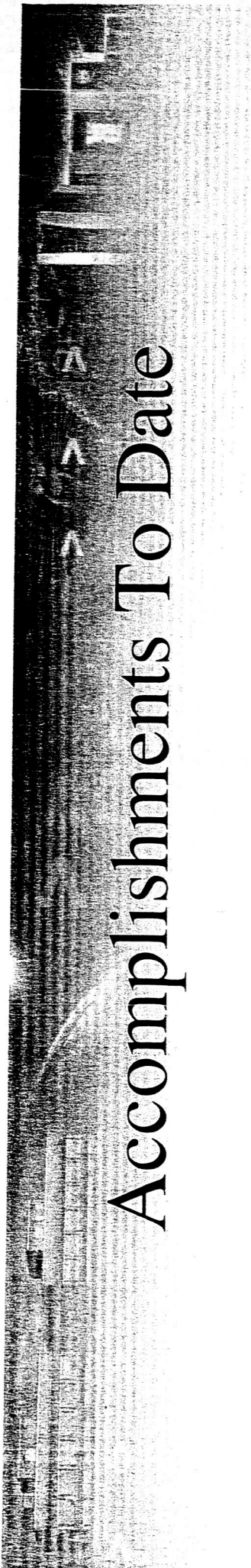
[Required Hardware and Software Configuration](#)
[GAINING ACCESS TO IVoDS](#)
[IVoDS Capabilities](#)
[FAQ's](#)

It is recommended that you print these procedures or save these procedures on your hard drive. Halfway through the procedures, you will need to reboot your machine and that will force you to reconnect.

Client Software Download



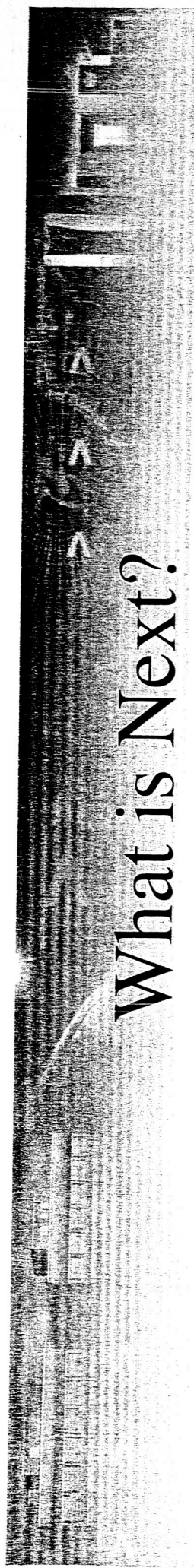
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Accomplishments To Date

- Developed full featured SDOG portal using the GCE portal framework
- Developed Grid and Web services that provide access to supercomputing resources for Space Operations
- Converted a legacy POIC application (TReK) to a Grid service
- Converted simulation code for Low Gravity Combustion Research (targeted to either the ISS or Shuttle) with integrated access to simulated real-time telemetry via the TReK grid service
- Delivered preliminary prototype in July 2004 simulating the user based services but not fully Grid enabled

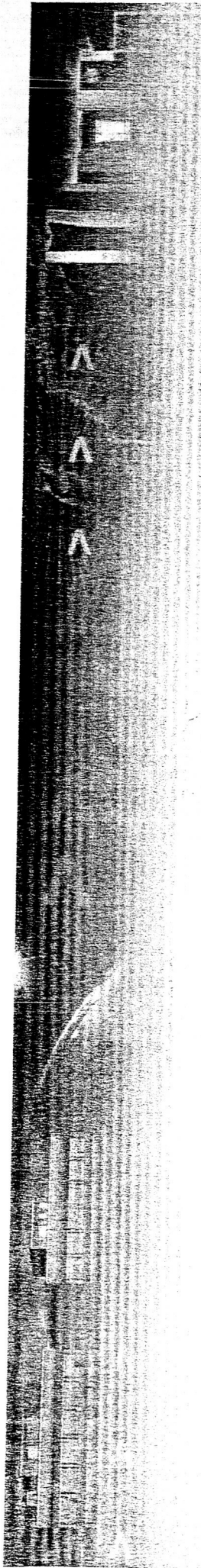




What is Next?

- Final Deliverable: Space Development and Operations Grid in March 2005
 - Grid and Web enabled user-based services as feasible with security
 - Four Grid Virtual Organizations: Payload Control Center Operations, Science (PI) Operations, Flight Control Center Operations and Outreach
 - Quasi-operational Grid prototype that can be used by the VO disciplines
 - Recommendations for future direction
- A feasibility study with recommendations





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